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THE ECONOMIC GEOGRAPHY OF GREEN COUNTY, WISCONSIN

By

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A Thesis Submitted for the Degree of

MASTER OF PHILOSOPHY

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I. Introduction

Southern Wisconsin has long been known for the production of Swiss cheese. This industry began in Green county which is at present the leading producer of Swiss cheese in the United States. It has been asserted that the local distribution of Swiss cheese making in this region has been a response to soil and climatic conditions.

It is the purpose of this thesis (1) to study the main factors of the geographic environment of Green county; (2) to trace the economic development of the various industries; and (3) to consider the present economic conditions of the county.

An attempt will be made to analyze the various conditions making for the development of the dairy industry in Green county for the special purpose of showing how the manufacture of Swiss cheese became the most important industry of the county through a combination of geographic influences with historical and economic factors.

II. The Geographic Environment

The geographic factors which stand out as most important in the interpretation of the agricultural development of any region are topography, soils and climate. Topography and soils are direct results of the physiographic history of the area. Therefore, the physiographic development of Green county will be analyzed, in order that the topography and soils of the county can be better interpreted.

General Location.-

Topographically, Green county is a part of the southwestern upland of Wisconsin. This upland lies between the Wisconsin river on the north, the Mississippi on the west, and the terminal moraines of the Wisconsin ice-sheet on the east. The southwestern upland lies upon the back slope of a cuesta formed by the Galena-Trenton limestones. To the south the upland extends into the state of Illinois.

General Topography.-

Military Ridge, the crest of the cuesta, constitutes the divide between the short northward flowing tributaries of the Wisconsin river and the longer southward flowing streams tributary to the Rock and the Mississippi. The northward facing escarpment is short and steep when contrasted with the long gentle descent to the south. Long continued weathering and erosion are responsible for the various features carved on the surface of the upland. These activities also have had much to do in the formation of the soil covering the area under consideration.

Geologic History.-

In order to gain the proper perspective of the rocks and the soils, of the drainage and water supply of Green county, it is necessary to consider the geologic history of the county. At the base of the geologic column in this area are found the pre-Cambrian crystallines. These ancient rocks, intensely folded and much metamorphosed, are probably the roots of a former mountain system. This old land mass was reduced to a peneplain, upon which, during periods of submergence, were deposited a series of sedimentary rocks. Since the last emergence, some of these formations,

such as the Niagara, have been stripped away, and others beneath the Niagara have been partially removed.

Rock Formations.-

After the pre-Cambrian peneplain had been formed, the sea encroached upon the land and a series of strata known as the Potsdam sandstones were deposited. Under Green County these beds are from 700 to 900 feet in thickness. The Potsdam does not outcrop in the county but is penetrated by the deeper wells, thus becoming an important source of water supply. The next formation to be deposited was a dolomite known as the Lower Magnesian. In the eastern part of the county, the Sugar river has eroded a wide valley in this formation. During glacial times this trough was filled with fluvio-glacial material much of which remains at the present time. Lying unconformably upon the Lower Magnesian is the St. Peter sandstone. Outcrops of this formation are found on either side of the Sugar river bottoms and also in the valleys of the larger streams of the uplands. The St. Peter is an important source of water supply and where exposed weathers into a type of sandy soil. Upon the St. Peter were deposited the Galena-Trenton dolomites. Much of this formation has been removed even from the higher sections of the county and the larger streams have cut entirely through it. Weathering and erosion have produced in these dolomites the undulating topography characteristic of the uplands. The decomposition at the surface of this formation has helped to produce the most important soils of Green county. The last formation to be deposited was the fluvio-glacial material making the bottoms along Sugar river.

Influences of Glaciation.-

Prior to the glacial period the upland of Green county was much as it is at present. One of the early ice-sheets covered almost all of the county but the existing glacial deposits are so slight as to be wholly neglected in studying the soils of the upland area. Before the glaciers came the valley of Sugar river was much deeper than it is at present. Not only was this stream valley throughout Green county filled to a hundred feet or more with materials from the ice-sheet, but during the latter part of the glacial period, Sugar river and its tributaries in the county formed a temporary lake(1). This condition resulted in the deposition of silts and finer sediments not only in the valley of the main stream but also in the troughs of its tributaries. The outlet of this lake is thought to have been the col which crosses the upland and connects the headwaters of Richland creek with a tributary of Sugar river(2). At the head of this tributary is the village of Juda and the col is now traversed by the Chicago, Milwaukee and St. Paul railroad between Monroe and Juda.

With the draining of this lake to the south, Sugar river and its tributaries set to work to adjust their courses to the fillings made during glacial times. As a result of this adjustment, terraces were formed along Sugar river, especially in the vicinity of Brodhead. That the adjusted drainage conditions are not yet complete is shown by the narrow swampy areas along the lower bottoms of Sugar river and many of its tributaries.

Summary.-

Green county is underlain by sedimentary rocks which have a slight dip to the south. Its general surface is that of a maturely dissected plain and is characterized by (1) an undulating upland of subdued topography whose

general slope is southward and (2) the broad flat-bottomed valley of Sugar river in the eastern part of the county.

Soils.-

The soils of Green county are very closely correlated with the topography of the county, and the organic content of the various soils is clearly connected with the native vegetation of the section considered. In the discussion of the soils of this county, the key to their main classification is topography. A correlation will, therefore, be made between the soil and its topographic position. It will, also, be shown that native vegetation influences the various soils to a marked degree. The soil type, therefore, is closely related to the topography and native vegetation.

The Soil Classification.-

The soils of Green county may be divided into two general classes: (1) those on the uplands, and (2) those in the main stream valleys. The former consist of residual materials overlying the dolomites but with which may be incorporated a great deal of loess. The soils in the valleys are all transported.

The Upland Soils.-

The native vegetation of these soils has had important effects upon their general characteristics. Thus, the two main classifications of these soils in Green county are: (1) the dark brown prairie soils, and (2) the light colored timber soils. These two soils are the most important in the county.

The Dark Brown Prairie Soils.-

The extent of these soils in Green county is shown on the generalized map. Figure 1. They cover the original prairie regions and have never

supported a forest growth. The native vegetation consisted chiefly of prairie grasses with only a limited tree growth along the borders of the prairies and adjacent to the stream courses. As might be expected from a study of the topography of the area occupied by these prairie soils in Green county, a marked difference will be found between the soils on the gently rolling uplands and those of the steeper valley slopes. The term, Marshall silt loam,is applied to the soils of the gently rolling areas. In Green county, this type is dark brown or occasionally black in color. The depth of the darker soil ranges from eight to twelve inches. In this county the Marshall silt loam is formed by an admixture of residual materials from the underlying Galena-Trenton dolomites and transported silty material largely of loessial origin. The soils on the valley slopes are not as deep as those of the Marshall silt loam. Their shallowness is due to long continued surface washing which has carried away most of the loessial material. However, the general dark color of these prairie soils even on the steeper slopes indicates the presence of a great deal of organic matter.

The Chemical Composition of the Prairie Soils.-

All of prairie soils of Green county are quite similar in chemical composition. Their analysis indicates between 1,300 and 1,400 pounds of phosphorus, 35,000 pounds of potassium, and 5,000 pounds of nitrogen per acre down to a depth of eight inches. Their relatively large nitrogen content is due to the greater accumulation of organic matter which has taken place in these soils on account of their having been in prairie rather than in timber. It is probable that the higher phosphorus content of these soils as compared with the timber soils is closely related to the greater amount of organic material in the prairie soils. When first broken the prairie soils of Green county showed a high degree of fertility, and they still do

except where poor farming methods have caused their deterioration.

Improvement of the Prairie Soils.-

The improvement of these soils in Green county demands an increase of active organic matter. This can be supplied through the use of green manuring crops, legumes, and large quantities of barnyard manures. These prairie soils are acid and the application of ground limestone has given excellent results, especially in alfalfa growing. The limestone applications seem not only to correct the acidity but also appear to make available for plant use much of the unavailable phosphorus under acid conditions.(3)

The Light Colored Timber Soils.-

The timber soils are in general silt loams and in Green county have an average depth of ten to twelve inches. As is the case with the prairie types, the surface soil grades into a residual clay-like subsoil. These soils were originally well timbered and portions of the county still have a forest growth in which white and black oaks predominate. Maple, hickory and basswood are also found. As would be expected, the depth and general conditions of the timber soils vary according to the topography of the section which the soils cover. Much of the timber land in Green county is rather steep in character. Consequently, there has been much erosion on these steeper slopes, frequently exposing the subsoil. Along many of the small valleys the eroded materials have accumulated making the soil deeper there than is usual. The flat-like lands along the narrow ridges have been very much eroded, especially by sheet washing since being brought under cultivation. These timber soils of the county contain a great deal of loessial material, except on the steeper slopes where erosion has carried away much of the surface soil.

Chemical Composition of Timber Soils.-

The timber soils of Green county contain on the average 900 pounds of phosphorus, 35,000 pounds of potassium, and 2,700 pounds of nitrogen per acre to a depth of eight inches. The virgin soils of these timbered areas contain considerably more phosphorus but the cropping to small grains, especially wheat, during the past years, has removed important quantities of that element. The deficiency in nitrogen and organic matter in these light colored soils is due to their previous forested condition.

Improvement of the Timber Soils.-

The deficiency in phosphorus is one of the limiting factors in the agricultural uses of the timber soils of Green county. The content of available phosphorous must not only be maintained; it must be increased. In general, the phosphorous of the timber soils has been more readily available than the phosphorus of the prairie lands. This may be on account of the greater acidity of the latter. This greater availability may help to account for the relatively small amount of phosphorus remaining in the timber soils. The total potassium content is sufficient to meet any demands but its availability will depend upon the supply of actively decomposing organic matter. The improvement of the timber soils of Green county will then require the addition of phosphorus and organic matter to the land. The first may be added by the use of phosphorus in commercial fertilizers or by importing feedstuffs, especially in concentrated form, and applying the manures to the soils. The organic content may be increased by the use of green manures, legumes or barnyard manures. The problem of preventing erosion of the upland soils of the whole county is a very serious one but is more serious on the timber than on the prairie lands. On the steeper slopes of the uplands there

has been in the past a great deal of gully erosion and much more surface washing of the soils. The effects of erosion, itself, may soon become a limiting factor in the agricultural utilization of the more sloping lands of Green county. It was mainly upon these timber lands that dairying first became important. At present, it appears that the dairy industry is relatively more important upon the timber soils than upon other soils in Green county.

The Rough Stony Land.-

Scattered through the uplands of the county and especially in the timbered sections are patches of rough stony land. The slopes of these areas are too steep for cultivation and are therefore usually utilized for pasture.

The Sandy Soils of the St. Peter Outcrops.-

These soils in Green county are fine sandy loams formed by the breaking down of the St. Peter sandstone and by the addition of colluvial material from the areas above them. They originally were forested and are very acid.

The Bottom Land Soils of Green County.-

The soils of the main stream valleys in the county may be divided into two classes: (1) the dark colored bottom soils, and (2) the light colored bottom soils, or the sandy soils.

The Dark Colored Bottom Soils.-

These soils in Green county are but narrow strips along the stream courses. The lowest of them are swampy, being subject to annual overflow, and are, therefore, utilized for pasture and hay. Their native vegetation in the county consists mostly of willows and coarse grasses. Back from these lower bottom soils and extending along the valleys of Sugar river and its

tributaries is another group of bottom soils with the characteristics of heavy loams. As to origin, they are transported soils; some of the materials are alluvial, some colluvial, and intermixed with these is a rather large amount of loess. The native vegetation of these heavy loams consisted of ash, soft maple and oaks. All of these dark colored bottom soils are productive and are relatively high in phosphorus, nitrogen and potassium. In addition to their virgin fertility, they are continuously receiving alluvium washed from the higher lands, especially since the beginning of the agricultural development of the county.

The Light Colored Sandy Soils.-

In the vicinity of Brodhead is a large tract of light colored sandy soils. These occupy a terrace plain and are the poorest soils in the county. They are made up of sands of fluvio-glacial origin. Their low content of organic matter is indicated by their light color.

Chemical Composition of the Light Colored Sandy Soils.-

In the surface eight inches, these sandy soils contain per acre about 1,000 pounds of phosphorus, 20,000 pounds of potassium, and from 1,000 to 2,000 pounds of nitrogen. The relatively small amount of organic matter does not help to make the low quantities of phosphorus and potassium sufficiently available.

Improvement of the Sandy Soils.-

The first step in the improvement of these soils in Green county is to increase their organic content. On account of the acidity of these soils an application of 2,000 to 4,000 pounds of ground limestone is usually required. With their acidity corrected these soils will produce clover,

alfalfa, soy beans and other legumes. Acid phosphate applied at the rate of about 300 pounds per acre has been found to give good results.

Summary.

The soils of Green County may be classified under two main divisions: (1) the soils of the uplands, and (2) the soils of the valley bottoms. The soils of the uplands are by far the most important in the county. These upland soils are further differentiated into (a) the dark brown prairie soils, and (b) the light colored timber soils. The former are particularly distinguished because of a high content of organic matter, which, however, may be inert, as in the old fields. They also contain a higher phosphorus content than do the timber soils, though a part of the phosphorus may be unavailable on account of the acid condition of the soil. The soils of the slightly rolling uplands contain large amounts of loessial material. Erosion has carried away the loess from the steeper slopes and has deposited some of it in the valleys below. The soils of the valley bottoms are alluvial in character. The lowest of these soils are black in color, flat, poorly drained and subject to annual overflow. These low soils are utilized for pasture and hay. The higher valley bottom soils are made up of silty loams. As they are productive, they have been utilized especially for growing cereal crops. The poorest soils of the county are the sandy soils in the vicinity of Brodhead. These are terrace soils and are very acid. However, some of them have been utilized for agricultural purposes for more than a half century. It is on the soils that most of the commercial fertilizers now used in Green county are applied.

Conclusions.

The soils on all the uplands of Green county are subject to sheet washing and on the steeper slopes gully erosion has done and is doing a great deal of damage. Steps must be taken to prevent all kinds of erosion of soils

in the county and should be taken immediately. The soils of the whole county are low in phosphorus and active organic matter. The key to permanent agriculture in Green county, from the standpoint of its soils, is to be found (1) in controlling the leaching and erosion of the soils, and (2) in maintaining and increasing both the organic matter and the phosphorus content of the soils. Leaching and erosion can be largely controlled by adapting the type of farming to the topographic conditions of the lands. Organic matter can be supplied by the use of green manure crops and legumes and by the application of barnyard manures. The phosphorus content of the soils of Green county was greatly depleted during the period of grain farming. Phosphorus is the important element to be supplied to the soils of Green county. A large part of this phosphorus must be supplied in the form of commercial fertilizers for even in the best managed dairy farming - that is, where concentrated feeds are imported, thus returning some phosphorus to the soil - more phosphorus is taken out than is returned to the soil.

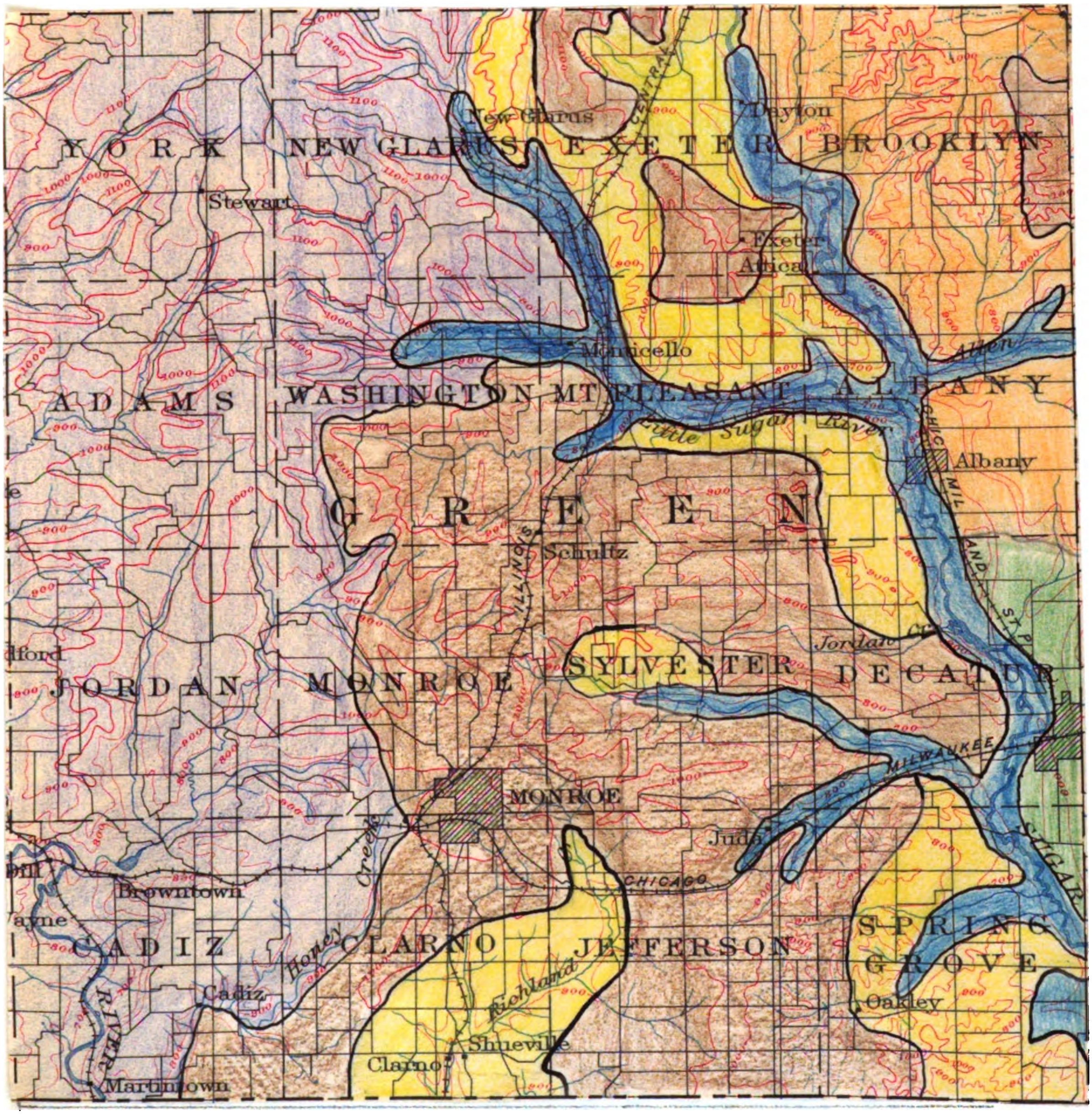

Figure 1.

SOIL MAP OF GREEN COUNTY

■	Wet Land	□	Timber Soils
□	Loamy Soils	□	Dark Prairie Soils
□	Sandy Soils	□	Unsurveyed - most of it timber soils

Climate of Green County.-

Climatic conditions are most important factors in the environment of growing plants. The kinds of crops grown in any region are limited by the length and temperature of the frost free growing season and by the amount and distribution of the rainfall. On the uplands of Green county the average date of the last killing frost in the spring is during the first week in May and the average date for the first killing frost in the fall is about October tenth. This gives for the uplands a frost free growing season of 150 to 160 days.(4)

In the valleys of the county the growing season is longer than on the uplands. The average of eleven years observations at Brodhead, which is located in the bottoms of Sugar river , show an average of 183 days for the frost free growing season. At Brodhead, the average date of last killing frost in the spring is April seventeenth and for the first killing frost in the fall is October seventeenth.(5)

The distribution of temperatures through the year for Southern Wisconsin is shown in the following graph:(6)

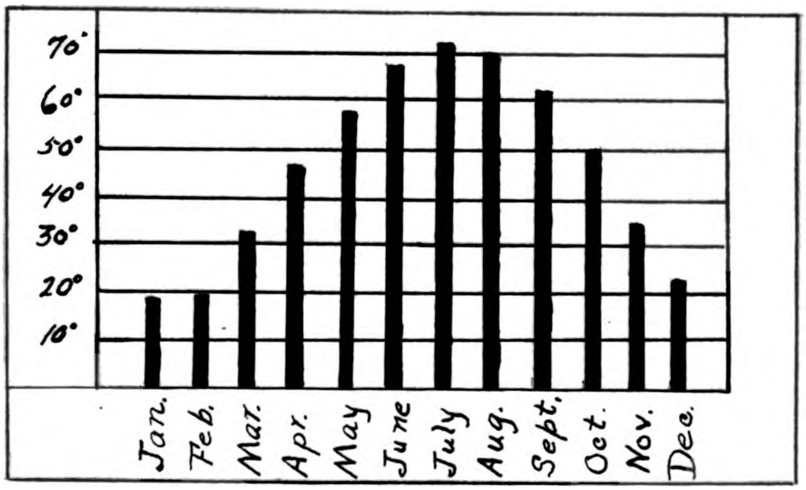

Figure 2.

The average annual distribution of rainfall for Southern Wisconsin and the average amount of precipitation for each month is shown in the following graph:(7)

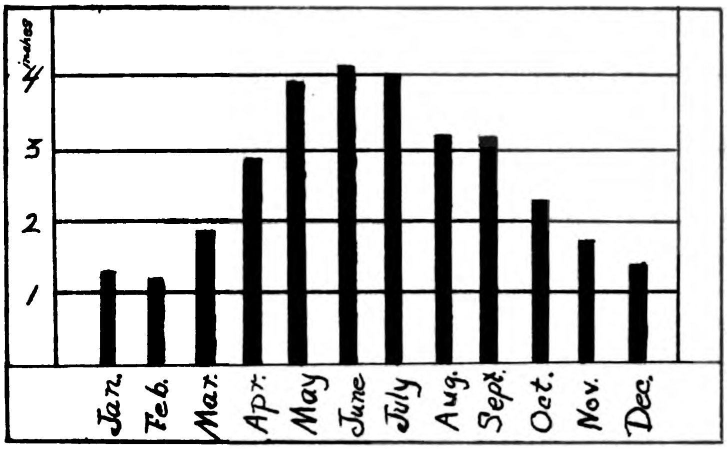

Figure 3.

It is important to observe that the winter months have the least precipitation; also that the greatest rainfall occurs during the three months-May, June and July.

By comparing figure 2 with figure 3, it will be seen that most of the rainfall of Southern Wisconsin occurs in the period just preceding and during the season of crop growth. The effective moisture of the soil will vary not only with regard to amount of rainfall during the growing season, but also will vary with respect to (1) the water holding capacity of the soil, and (2) the humidity of the atmosphere, and (3) the temperature during the period of growth. There is not enough difference in the humidity or in the temperatures of the various parts of Green county to warrant a discussion of these factors in this place. The differences of the soils are, however, important in this respect. The retentiveness of soils for moisture varies with their depth, their texture and the amount of organic matter incorporated with them. Thus, for Green county, the most retentive soils are the deep

alluvial loams along the stream valleys. The black prairie soils are more retentive than the light colored timber soils though this will vary locally as the topography helps to determine the depth of the upland soils.

Summary.

The uplands of Green county are characterized by a shorter growing season than the adjoining lowlands. The climate is a limiting factor in corn production but is very well suited for the production of grass, hay and legumes. The use of the land for pasturage is encouraged by the topography, and the cool moist summers are well adapted to the growth of all forage crops.

III. Economic Development

The discussion of the surface features, the soils and the climate of Green county brought into consideration those factors which limit the agricultural possibilities of the county. In tracing the economic development of the county, emphasis will be placed upon the influence of geographic, economic and historical factors, in order to show their effects during the pioneer period, the one crop period, and the period of transition leading up to the present conditions in the county.

The First Settlements.-

Strangely, it was a mineral resource which brought the first settlers to Green county. By 1826, the news of the lead discoveries in southwestern Wisconsin had been carried to the older settled regions of the country and in 1827 the first white men to see Green county passed through on their way to the lead mines farther west. The first settlers came in 1828 for the purpose of trading with the Indians. These traders stopped at the Old Indian Diggings near the present site of the village of Exeter, where they were soon

joined by a few miners. About the same time two or three men opened up a lead mine in the present township of Monroe. A few more miners drifted in but settlers did not increase until after the close of the Black Hawk war. This war began in 1832 and broke the power of the Indians in the lead region of the state. When peace was restored the movement of settlers continued and by 1839 the county had a population of 500. Just as soon as a patch of land was broken, it was planted to grain or to potatoes. In 1839 or but a few years after the Indian uprising had been allayed, the county produced 12,000 bushels of wheat, 20,000 bushels of oats, 25,500 bushels of corn, and 15,500 bushels of potatoes.(8)

Settling the County.-

The first settlements, as has been indicated, were on the uplands, and near the present sites of Monroe and Exeter, respectively. Both of these settlements were abandoned during the Black Hawk war and all of the buildings were burned or destroyed. At the close of the war the miners returned and new buildings were soon erected near the sites of the old settlements.

Monroe.-

Mining had begun in what is now the township of Monroe about 1829 when lead was discovered on Skinner creek. A smelting furnace was erected soon after the discovery, but on the return of the settlers after the Black Hawk war mining soon gave way to farming. In 1835 only thirteen acres in the whole county had been broken but by 1844 one-third of all the land in the county had been taken up. The houses of these first farmers were made of logs. The furniture was primitive, most of it having been made by the settler himself. The forest was not only a source of shelter for these pioneers but it also helped provide food for them. Wild turkey and wild deer were plentiful.

The woods abounded in smaller game and they furnished fruits such as wild plums and berries. The wild crab apple, sweetened with molasses made from cane, became an important article of diet. As would be expected under such conditions, low prices and poor markets for their products were discouraging. A letter dated 1846 states "that flour is three dollars a barrel, wheat cannot be sold, oats are twelve and one-half and corn is twenty cents a bushel". In 1848 or '49, a farmer is reported to have hauled oats from Monroe township to Janesville for six and one-fourth cents a bushel and to have sold calves at three and one-half dollars apiece.(9)

The Settlement at Exeter.-

This settlement has already been referred to in the early settlements of the county. About 1829 a trading post was established near the present site of Exeter and a little later a log smelting furnace was built. The first lead smelted at Exeter was hauled by oxen to Galena where it was sold at $80.00 a ton. After the close of the Black Hawk war, the miners returned to the "diggings". However, lead mining became less and less important and with the incoming of settlers, farming became the dominant industry in the locality.

The Settlements in Sugar River Valley.-

The first men to come to Green county were miners and as the lead mines were all located on the uplands, the valley lands were neglected for a time. As farming became important the fertile bottom lands were appropriated. Cereal crops were grown and gradually live stock was introduced. With the development of farming came a demand for lumber for use in the construction of buildings, and likewise there was a demand for mills to grind the wheat and the corn. As would be expected, mills were built at favorable places along the Sugar river and its tributaries. At these places the water power was used first for saw-mills. In a short time a grist mill was constructed

which often was later transformed into a flour mill. At each of these locations where mills were built a village soon grew up. These villages, such as Dayton, Albany and Decatur, thrived for a time, but their later growth was determined largely by railroad facilities. In the case of Decatur, the railroad was built to Brodhead, a distance of but three and a half miles. Decatur had been laid out in 1848. In 1857 the railroad reached the present site of Brodhead. At that time the village of Decatur had fine stores, two hotels, two blacksmith shops, a wagon shop, a shoe shop, and a population of about four hundred inhabitants. Very soon after the coming of the railroad to Brodhead, most of the business of Decatur removed to Brodhead. One of the first improvements accomplished by the citizens of Brodhead was the digging of a mill race, from the river dam near Decatur to the present site of Brodhead. The canal was dug through the lower bottoms of Sugar river. The water power was then used in operating a grist mill and today is used to run a flour mill and supplies power for the city electric light plant.

In a few cases in the early days, the water power was used to operate carding machines such as one erected on Honey Creek, a tributary of Sugar river, in Clarno township. One of these grist mills formed a nucleus for the village of Monticello on Little Sugar river, and about 1866 a woolen mill was erected which is still in operation. These various little villages were trading places for the farmers of the county and by 1860 most of the land in Green county had been taken up by settlers. New Glarus had been settled by the Swiss colonists in 1845 but the history of their settlement and expansion over the county will be treated more fully in a later chapter.

Difficulties of Early Farming.-

The struggles and hardships coincident to pioneer life are familiar topics, yet each district had its own peculiar difficulties. In Green county

the most formidable drawbacks were markets and prices. The influence of these two factors will be noted again and again in interpreting the various stages of the economic development of the county. These factors had much to do in determining the type of farming practiced during these various stages.

Prior to their being produced by the farmers, foodstuffs such as pork and flour had to be imported. Prices were high and money was scarce. A glimpse of these pioneer conditions is afforded in the following letter written by a lady who had moved into Clarno township:

> "We, like most families, brought meat, flour and a little money with us. Flour was $13.00 and pork $16.00 a barrel. Calico was fifty cents a yard and other kinds of cloth proportionately high. In many families, the men wore buckskin clothes, having tanned the skins themselves, and the women were so industrious with their spinning wheel and the loom that the cloth for the family cost only what was paid for the warp of its linsey. I bought some soft soap and paid a dollar a gallon. At first butter was fifty cents a pound. By the time we had cows, butter was down to a shilling. That was the way with everything of this type; so high we couldn't buy it the first year, so plentiful we couldn't sell it the next. Before hogs were produced, the usual meat used was bacon brought overland from Galena." (10)

Another type of drawback lay in the inadequate farming implements. Most of the plows were made on the farm or perhaps with some help from the country blacksmith. Grain was cut and bound by hand, threshed with a flail, and winnowed by being tossed in the air by aid of a shovel. Even after the grain was cleaned a long and difficult journey was often required to get it to a mill. This then was a period of self sufficing agriculture. Every farmer was his own carpenter, blacksmith, thresherman and butcher. The point to be emphasized is that these pioneers of Green county had but little money with which to start farming operations. Their purpose in taking up the new lands was to better themselves in a financial way. When their crops were harvested, there was but little market for them and in shipping their products,

transportation charges ate up the profits. The problem then of the early settler was an economic one and the farmers first attempt to solve it was by the production of grain.

The One Crop Period.-

Wheat was the staple crop produced in Green county during this period; it was the crop produced for the market - the one crop from which a money income was expected. Crops other than wheat were produced in Green county during this period. However, seen in perspective from the present, the production of live stock and the growing of other cereals were but incidents to the main industry - that of wheat farming. The reasons for wheat becoming the staple crop are varied. Southern Wisconsin was really a new region to be settled and naturally the first question asked by the pioneer in Green county was,"what crops can be grown?" It was generally believed then that all of Wisconsin was too far north to successfully grow corn. A type of corn had been raised in the state by the Indians but it was a small variety and gave but small yields. Even if corn could be successfully raised in Green county, it was too bulky and too cheap to be shipped a thousand miles to market. Oats could be grown successfully but high transportation charges prevented oats from becoming the main crop. Two reasons appear to have been urged during these early days against stock-raising in Green county as in other new sections of Wisconsin. First, it was generally believed that cultivated grasses and clover would not grow well in the county and,second,it was contended that the care required by the stock during the long cold winters would consume the profits. Probably the most important factor which prevented much stock-raising in Green county was the poverty of the settlers. It required capital to buy stock and additional outlays were necessary to

provide fences and barns. Economic conditions favored the growing of wheat. To secure a team of oxen, a breaking plow, and wheat for seed required comparatively a small outlay of capital. Moreover, wheat is a crop well adapted to new lands, and as is general throughout the wheat belt, the crop in Green county did best on new soils. The acreage gradually increased. More machinery and more effective harvesting and threshing methods were introduced. Thus the pioneer farmer of Green county turned to the raising of wheat for in this way he could get the quickest returns from his labor. Land was abundant and cheap. Labor was scarce and costly. The result was that the early agriculture of Green county was mere land skimming. Good cultivation of the soil was never thought of. The same land was planted successively to wheat as long as it yielded enough to pay for its cultivation. The only aim was to secure the largest yield for the smallest outlay of capital and without any regard for the future. Manures were never used; they were even hauled and dumped into the streams in order to get them out of the way. The strawstacks were invariably burned. Wheat, even though it was the staple crop, brought a low price - often not more than fifty cents a bushel. Before the coming of the railroads, wheat had to be marketed by wagons at some point from which it could be shipped by water. The wheat of Green county in this period was hauled to Milwaukee. As the country was sparsely settled, the roads were in poor shape. Often the farmer in hauling a load of wheat to Milwaukee actually returned in debt.(11)

These were the conditions up to 1850 and the future seemed to have no means of allowing the farmer to get out of the groove. For instance, the farmer did not have the capital to buy cows at twelve to fifteen dollars apiece, even if his hay and pasture were going to waste. However, a change did come. The price of wheat rose from thirty-one cents to a dollar seventy

cents between May, 1854 and the same month a year later.(12) This sudden rise in price has been attributed to the Crimean war. Another lease was given to the wheat industry in Green county and another period of soil exploitation began. The breaking out of the Civil War extended the period of exploitation up to about 1870. About 1860 the chinch bug had reached the southern portion of Wisconsin and Green county was one of the first to be affected. For the first two or three years the effects of the insect were not very noticeable but in 1864 a good portion of the wheat crop of the whole state was destroyed,and in the two succeeding years the insect made a clean sweep of the wheatfields of the state.(13)

The farmers of Green county kept up the acreage of wheat for a few years but by 1870 they had begun to look for a different system in agriculture.

Summary.

This summary is an abstract of an article "Agricultural History of Green County". "The first settlers had an advantage in the proximity to the lead mines. These furnished them a ready market at good prices for all their surplus products. The mining industry in Green county was important. When the lead mines of Lafayette, Iowa and Grant counties began to supply themselves by their own agricultural products, the farmers of Green county still had an outlet.for their exports in the Wisconsin pineries. But soon the pineries were being supplied from fertile fields nearer home, and the Green county farmer was compelled to cart his surplus crops to the lake shore; thus these crops came in competition with the older settled districts of the country. The transportation was mainly by ox teams and often the farmer taking a load of wheat to Milwaukee actually returned in debt. Green county when first settled was as fine a wheat

growing country as any on record. I have known as many as forty bushels of good spring wheat to be grown to the acre on large tracts of land. A yield of thirty to forty bushels per acre was common. Wheat was about the only crop grown in this county until the chinch bug made its appearance."(14)

Transition to Dairying.-

After the wheat began to fail the raising of pork for the market became an important industry. During the stimulus to the wool interest caused by the Civil War, the farmers of the county went largely into sheep raising, though this industry was practically given up within twenty years after the close of the war. Even as early as 1884, it was recognized that dairying had become the most important industry in the county. "Because of this industry the people of the county have been able to pass through two almost entire failures of the corn crop without a ripple in their finances". In 1884, there were seventy-five cheese factories in the county, of which forty-eight were making Limburger cheese, twenty were making Swiss, and seven were making American cheese. The number of milch cows in the county for the same year was over 17,000 and the value of cheese made each day in Green county for the year 1883 at an average of ten cents a pound was $3,555.00.(15)

Another important factor making for the development of the cheese industry in Green county was the transportation problem. When the markets of the lead mines and of the pineries were closed to them, the farmers of Green county thought if only they had a railroad to Milwaukee and Chicago the problem would be solved. When work started on the Milwaukee and Mississippi Railroad (now Chicago, Milwaukee & St. Paul), the farmers along the line of the road subscribed all they could for the undertaking. Many even mortgaged their farms to further the enterprise. In time, the roads were

completed. The cry up to that time had been "quick transportation", but when the farmers wheat, oats, or corn had been whirled away to Milwaukee in eight hours, whereas it used to take him three weeks to haul it with an ox team, he found that the railroad freight and warehouse charges had eaten up his profits and he was in no better way than before the road was built.(16)

Then came the cry "Cheap transportation", and the subject of additional lines of railroads was agitated. There were at this time (1884) a few farmers in the county - notably, a Mr. Crowell of Queen's Prairie, several of the Swiss colonists of New Glarus, and a few others - who never seemed to worry over the transportation problem. It was noticed that five times out of every six when Mr. Crowell came to Monroe with a team, he came with an empty wagon and returned with it loaded. He was engaged in cheese-making and fed all the products of his farm to his milch cows and purchased large quantities of feed besides. The example of these men was sufficient for other farmers in the county. The cost of transportation of a pound of butter or of cheese is so insignificant when compared with the cost of its production that it is scarcely felt by the producer.(17)

In order to better interpret the great importance of dairying, and particularly the making of Swiss cheese in Green county, the next chapter will be devoted to the founding of the Swiss colony at New Glarus.

IV. The Swiss Colony at New Glarus

The story of the Swiss colony in Green county is one of the best known in America and in the Middle West. Swiss cheese is generally associated with Swiss settlements. The purpose here is to trace the history of this settlement in its economic relations to Green county.

Canton Glarus.-

The canton of Glarus from which the New Glarus colonists came is one of the wildest and most rugged in all of Switzerland. The canton is divided into two parts. Each part is a narrow mountain valley, and each valley is drained by swift, northward flowing streams fed by snows and glaciers of the Alps. At the head of the larger valley, Gross Thal, is a high mountain pass leading into the ancient canton of Uri. At the head of the smaller valley, Klein Thal, is a similar pass leading into the Grisons, and thence on to Italy. Prior to the time of modern transportation, both of these passes were much used highways between Italy and Germany. In times of peace, they were used by traders and travelers; in times of war, by the armies of different nations of Europe.

Judging from the situation of the canton and from the names of localities, these valleys were originally peopled from both the north and south sides of the Alps. The southern element seems to have been the stronger in leaving its impressupon the people of Glarus. Dark hair and complexions prevail among the people and many names ending in "i" or "y" - such as Marti, Klasy, Tchudi, etc. - indicate an Italian origin. Yet the blue eyes, fair hair and complexions of the north Germans are not rare and family names of undoubted German origin such as Luchsinger, Schindler and Schmidt, are numerous. Canton Glarus, isolated and hemmed

in on almost all sides, was the source from which came the sturdy colonists who settled New Glarus.

Causes of the Emigration.-

The causes which led to the establishment of the New Glarus colony were mainly (1) overpopulation of an unfertile country, and (2) the poverty resulting from scarcity of employment. For many years prior to 1844, Europe in general had enjoyed an uncommon prosperity. In Switzerland, especially, trade and manufacturing had greatly increased. The large numbers of young Swiss who were formerly compelled to seek work in foreign countries now found employment in these home industries. But about 1844 came a general stagnation of business. An over-production of manufactured goods glutted the markets and the demand for Swiss goods decreased. In a short time, a large number of Swiss workingmen were out of employment. In addition, a partial failure of crops in Switzerland caused the necessaries of life to rise in price. Distress became general among the working people, and a serious question arose as to how to employ and feed the ever-increasing population. Cultivable land in canton Glarus was of very limited extent. At this time the parcels of land allotted to each family ranged from one hundred sixty to six hundred forty square yards. Under these conditions, labor was becoming more plentiful and thus cheaper. Food was becoming scarcer and its cost was increasing.

The Migration.-

The agitation resulting from the economic conditions culminated in the idea that an organized emigration, under the control and care of the government, would be the best and surest method of affording relief.(18) An association for this purpose was formed and the following resolutions were set forth: (1) The emigration shall be executed in common. The idea

is to found a community similar to that of the canton of Glarus.

(2) In the course of 1844, two agents will be sent to visit the states of Ohio, Indiana, Illinois and Missouri for the purpose of selecting a tract of land large enough for the experiment.

(3) Every family willing to emigrate shall receive twenty acres of land; the money to pay for this land will be advanced by the association. In regard to the purchase of the tract of land, the agents were instructed to consider the climate and the nature of the soil which should resemble as near as possible the climate and soil of the old country, and the tract selected should be suitable for the production of grain and cattle.(19)

Two men were chosen to go in advance and to select a suitable tract of land. Upon arriving in the United States they proceeded to Allentown, Pennsylvania, where some Swiss people were living. At this place, a guide was chosen to go west with them and to aid in selecting the land. The little party then returned to New York City, went up the Hudson to Albany, thence to Buffalo. Their next stop was at Detroit from which city they traveled across Southern Michigan and to Chicago. At the land office at Chicago, they found that much prairie land was open to entry but that timber lands had already been taken up. From Chicago, they went to Dixon on Rock river. At the land office at Dixon, they found that prairie lands were open but as at the Chicago office, that the timber lands were not available. From Dixon, they proceeded to St. Louis, and then made a trip through north Missouri, and into Iowa Territory. Leaving Iowa, they crossed into Wisconsin Territory and arrived at Mineral Point in June. "Although we had traveled in a number of states, we had not yet decided to buy anywhere for reasons that either wood or water was wanting; that the location was unhealthy, or that a sufficient tract of suitable land in one body was not available". At the land office at Mineral Point, they were

informed of the land near Exeter in Green county. The party looked about for a short time but soon proceeded to examine the land in the vicinity of Exeter. "Here, at last, we found a large extent of land suitable for our purpose and containing the prescribed qualities, such as a healthy climate, copious springs, fertile soil, timber, and the prospect of a convenient market for produce." The tract of land of 1200 acres was bought and the two agents began to prepare for the colonists.(20)

Meanwhile, the colony had left the old country and had reached St. Louis. Here they were informed to proceed to Galena. On August 15, 1845, one hundred eight of the original one hundred ninety-three emigrants assembled at New Glarus. A Mr. Duerst, one of the men who had helped select the site for the settlement, sent the following report August 19, 1845, to the Emigration Association in Switzerland: " We have selected and bought what we believe to be a favorable area for settlement. This land lies eight miles from Exeter and thirty-five miles from Mineral Point, where great markets are held. It contains mostly fertile soil, good water in springs and streams, and sufficient forests. One of the streams running through our land has sufficient power for one or two mills and we indulge in the pleasing hope that our fellow-citizens who may emigrate, will, if they are industrious and steady, find themselves in time well rewarded for their labor. The colonists, one hundred and eight souls, have arrived after a long journey, in which they experienced many hardships, and are so destitute of everything that we were at once obliged to draw upon our credit in New York, so as to be able to supply their needs until the next harvest. We have provided temporary shelters for them, and have allotted the parcels of land to each colonist.(21)

The First Winter.-

The colonists had brought with them from Switzerland their tools and cooking utensils. When they arrived there was little food on hand save what they had brought from Galena. Fish were caught from the streams. Some foodstuffs were purchased. A large log hut had been constructed which was occupied by all the colonists at the first. New log houses, sixteen in number, roofed with wild hay, and large enough to accommodate two families, were put up as soon as possible, so that by Christmas the colony was fairly housed. They were helped considerably by receiving the sum of one thousand dollars which had been provided in Switzerland for their assistance. This money was expended partly for food and clothing and the remainder for live stock. When spring came, the colonists drew lots for their twenty acre portions, which consisted mainly of meadow or prairie land.

During this winter occurred the first secession from the main colony. As has been explained, small as Canton Glarus really is, mountain ranges divide it into two natural divisions: the Great and Little Valleys. "Each of these valleys, and in fact, almost every village, has some peculiarity of language or custom and the inhabitants of each section cherish a strong clannish feeling for their own people. This clannish spirit, born in the valleys of the fatherland, showed itself from the start, in spite of their common interest in the venture. Each group of colonists preferred to associate with their own valley people. This feeling was particularly strong among the Little Valley folk, perhaps because of the secluded location of their old home. About one-fourth of the settlers were from the Little Valley. A few weeks after the arrival, as a result of a disagreement, the Little-Valleyites erected a separate shelter for themselves. In the spring, they rejoined the main body. Several of these same families, after a year or two, abandoned the colony altogether and removed to larger

tracts of land in the towns of Mt. Pleasant and Sylvester where there is now (1892) a large and prosperous Swiss settlement, mainly of Little-Valley people." (22)

Making the Beginning.-

After the land was allotted, each colonist began to prepare it for planting. The breaking of the ground was slow and laborious and was performed by the use of spades and shovels, for teams were not available until later in the season. Potatoes, beans and other vegetables were planted first. These were followed a little later by some corn. During the spring of 1846, the colonists were fortunate enough to buy some cattle that had been brought from Ohio to the vicinity of Exeter. Being excellent judges of cattle, the Swiss selected the best from the herd. The cattle cost about twelve dollars a head and were paid for out of the reserve fund before mentioned. During the first two seasons the breaking of the land and the construction of buildings were performed mostly in common. Out of the common fund, they purchased four yoke of oxen which were used in regular turn by each settler in breaking or doing other work.

From 1847 to 1854, the material progress of the colony was slow but sure. As soon as a colonist acquired fifty dollars, it was promptly invested in a forty acre tract of government land. In 1854, came the sudden rise of the price of wheat. This not only made wheat raising more important in New Glarus, but the sudden prosperity attracted other immigrants. Many of these new immigrants possessed sufficient means to buy land and live stock and to begin improvements. The newcomers came chiefly from the cantons of Glarus and Berne. Many from the latter settled in the townships of Jefferson, Clarno and Washington. The main crop raised from 1850 to 1870 by the Swiss colonists was wheat. The hillsides and undulating uplands

produced wheat continuously for twelve to fifteen years. When the price of wheat came down, when the hillsides were cut by numerous gullies, when the tilled hillsides were partly washed away, and when the chinch bug destroyed the wheat crop year after year, the Swiss farmer was forced to try another program.(23)

This new program consisted in the development of the dairy industry so that within a few years after wheat farming was given up, dairying and particularly cheese making became the leading industry in the Swiss settlements. However, by 1885, the Swiss people had settled in practically all sections of the county and when cheese making became the principal industry of the Swiss, it also became the important industry of the county. And since cheese is the leading product of Green county, the development of cheese making will be traced in the next chapter.

Summary.

The reasons for the Swiss colonists leaving the old country were economic. It appears that New Glarus was selected because there the agents found a large tract of land in one body which was partly timbered. It also appeared to possess the requisite soil and climatic conditions. The Swiss settlers were wheat growers until after the Civil War when they began to turn to cheese making as their dominant industry.

V. Present Conditions

The big majority of the people of Green county are farmers and most of these farmers are engaged in the dairy business. Dairying is the most important industry and is largely responsible for the financial well-being of the people of Green county. Their financial standing is indicated by statistics from the 1920 census which shows that the average value of all property per farm is higher in Green county than in any other county in the state.(24) The people of the county are well-to-do; their farms are well improved and rather well cared for. The general appearance of residences, of barns and silos, attest thrift and success in spite of the rolling lands with their hills and steep slopes. Dairying is the industry to be specially considered in dealing with the present economic conditions of the county because it is around dairying that all other activities of the county center. And since the manufacture of Swiss cheese is the most important phase of the dairy industry, this chapter will deal mainly with the economic development of the making of Swiss cheese and the outlook for this industry in the future.

The Geographical Environment.-

In the discussion of the physical environment of Green county, it was brought out that most of the soils of the county are better adapted for the production of hay and pasture crops than for producing grain crops. The climatic factors, such as temperature and rainfall, are well suited for the production of grasses, whether for hay or for pasture. The recent census report shows that the acreage of alfalfa, clover and timothy in Green county is relatively high in comparison to the acreage of the same crops in other counties of Wisconsin. The geographic environment in Green

county, however, possesses no qualities peculiar alone to this county.

Development of Swiss Cheese Making.-

The Swiss immigrants to New Glarus brought with them the knowledge of making Swiss cheese which they had learned in the Alps of Switzerland. In Green county these colonists found an environment favorable to the manufacture of cheese. Their lands were not well suited to general farming, but the conditions were favorable for providing good hay and pasturage. Cheese making began in the county with the settling of New Glarus for just as soon as a Swiss owned a cow he began to manufacture Swiss cheese. At the beginning, the industry was carried on in a very small way. It was with a pailful of milk, a copper kettle, and a wooden hoop made from a sapling that the Swiss colonist began this important industry. The cheese no larger than a saucer - so small that they could be lifted in the hand of a child - were the ancestors of the 150 or 200 pound cheeses of today. The little kettle, used for cooking purposes, and hung in the fireplace of the log cabin, was the predecessor of the cheese factory of the present. The colonists went to work with the poor means which were at their command and it was not long until their cheeses became larger and better. Not only were they gaining in experience, but were also increasing their number of cows.(25)

Among the settlers were some who had been herders and dairymen in the old country. These men had spent the short summers on the Alps, taking care of cows they had rented from the people in the valley. One or two of the colonists were expert cheese makers who soon began the manufacture of Swiss cheese as a business. The surplus cheese produced was marketed at Galena, Freeport and Madison. However, at this stage in the development only a few individuals derived any benefit from the sale of cheese. The majority of the Swiss tilled their lands and produced wheat as long as they could.

When wheat production failed, they were at their wits' end and really were in a critical condition.(26)

About 1870, a couple of cheese-makers from the East came into Green county. These men advised the Swiss to buy more cows and to become dairy farmers instead of wheat growers. Compelled to make some sort of change the farmers took their advice. Other cheese-makers from New York, Ohio, and even from Switzerland, came to the county. The growth of cheese factories was rapid; almost of a mushroom character. Probably on account of the demand of the German population in the state, the product of these early factories was chiefly Limburger. Because of the sudden rather large production, the market was soon glutted and the cheese panic of the '70's is still remembered in Green county.(27)

In spite of the cheese panic, the industry did not die as was predicted. About that time the cooperative system of cheese making became effective in the county and there has been a steady growth up to the present. In this cooperative system, four or five farmers provide a cheese factory and then secure a cheese maker who generally works on a percentage basis. The main results of this movement were: (1) Better methods of making cheese were used, and (2) a uniformity of product not attainable under the old method of individual making. With the production of a better grade of cheese, there came a market demand for the product.(28)

The statistics given in the following indicate in a general way the growth of the Swiss cheese industry. In 1883, Green county had 75 cheese factories. Of these, 48 made Limburger with a daily output of 21,183 pounds. There were 20 Swiss cheese factories and their daily output was 7,667 pounds. Although the American cheese factories numbered but 7, they had a daily production of 6,700 pounds. The value of the cheese made per day in Green county

for 1883 amounted to $3,555.00, the cheese being valued at an average of ten cents a pound.(29)

By 1899, practically all the farmers in the county were interested in the dairy business. There were 200 cheese factories and 30 creameries. It was estimated that 10,000,000 pounds of cheese were made in Green county in 1898, most of which was Swiss.(30)

In 1919, 3,563,417 pounds of Brick cheese, 2,324,928 pounds of Limburger, and 6,485,767 pounds of Swiss cheese were produced in Green county. The total value of the dairy products of the county amounted to about $10,000,000.(31) In 1919, there were 110 factories out of a total of 151 that were making Swiss cheese. Most of the factories making Swiss cheese also produced Brick cheese. In order to properly interpret the distribution of Swiss cheese and to indicate something of its future, a short discussion of its manufacture and of the difficulties of making the best grades will be given.

The Making of Swiss Cheese.-

The first essential in making good Swiss cheese is very clean milk and the second essential is a knowledge of the art of manufacture for while this variety is the most difficult of all cheese to make properly, yet the apparatus required is rather simple. In general, Swiss cheese is made only in the summer in Green county. The factory work begins about the first of March. The factories in the county produce Brick cheese from the small amount of milk received early in the season. Later, when the milk supply is larger, it is delivered twice a day and the factories begin making Swiss cheese. Usually, the manufacture of Swiss cheese continues until about the first of October. Swiss cheese is not produced in Green county during the winter, not because it requires "grass milk", but (1) on account of the low milk supply in the winter, and (2) the difficulties of running the cheese factory during

the cold season.(32)

Most of the factories now in use were built years ago and are generally small. Practically all of them lack the requisite cellar space for the proper curing of Swiss cheese. On account of this lack of space, the cheese maker is likely to put on the market a product which is not properly cured.

Difficulties in Making Swiss Cheese.-

Swiss cheese is not only the most difficult cheese to make but for high grade products, it probably requires cleaner milk than for any other cheese.(33) In Switzerland, the milk is regularly tested when brought to the factory and all the factories are under government supervision. No testing of milk has been done at the factories in Green county. Most of the cheese makers in Green county are at present native Swiss who learned the art in the old country. These men working under varying conditions in Green county and knowing practically nothing of the scientific principles underlying the processes of cheese making, have not always been able to produce a high grade product. The manufacture of Swiss cheese is the most profitable branch of the dairy industry in Wisconsin, but success and profit from Swiss cheese depends upon making a large percentage of first quality cheese. A great many factories have failed in the past for the reason that 25 to 75%, or even more, of their cheese was not first class and had to be sold at a cut price.

To illustrate the influence of prices, the market quotations of Fancy Swiss cheese in June 1921 was forty-eight cents a pound while No. 2 Swiss cheese at the same time was selling at twenty cents.(34)

New Developments in Making Swiss Cheese.-

All of the important commercial varieties of cheese are made from the same raw materials, cow's milk, rennet and salt; but variations in the

processes of manufacture and in the conditions under which ripening takes place, permit the growth of different kinds of bacteria in the different types of cheese.(35)

The study of the bacteriology of cheese making began in Europe and a scientific study of the principles underlying the manufacture of Swiss cheese has been made but recently. These methods were primarily worked out entirely from the standpoint of experience, but the processes were conducted in such a way as to influence the growth of certain bacteria. During the past thirteen years, these processes have been investigated in the laboratories of the United States Department of Agriculture. This work has resulted in production of two cultures for use in the manufacture of Swiss cheese. One culture appears to be capable of suppressing certain deleterious gas producing organisms in the cheese and the other culture appears to control the development of the eyes, characteristic of Swiss cheese.(36)

In a recent paper on "The Cause of Eyes and Characteristic Flavor in Emmenthal or Swiss Cheese", Dr. J. M. Sherman of the Research Laboratories of the Dairy Division, U.S.D.A., states: "Due to a lack of the proper natural inoculation in the milk, the Swiss or Emmenthal cheese industry in the United States has had only a limited success. The peculiar sweetish flavor which is characteristic of the best cheese of this type, is very commonly lacking in our American-made product. It is also frequently deficient in eye development, and in fact in some cases the cheeses are entirely "blind". Swiss cheese is made only during certain seasons in America, because of the uncertainty of obtaining the proper development of eyes and flavor. It would seem that this industry could be put on a sounder as well as a more scientific basis by the use of cultures which would cause proper ripening in the cheese. With such cultures at hand, it should be possible to make Swiss cheese of a uniform and high-grade quality throughout the year; such practice should

result in raising very materially the quality, as well as the quantity, of our American-made cheese."(37)

The value of these suggestions has been tested in other states than Wisconsin and the use of cultures has been successful when scientifically applied. During the summer of 1921, it was arranged for Mr. Gere, of the Dairy Division, U.S.D.A., to take charge of cheese making for the Brodhead Cheese and Cold Storage Company, at Brodhead, in Green county. The first thing accomplished by Mr. Gere was the testing of the milk as it came to the factory in order to grade out the contaminated milk, which was unsuitable for making Swiss cheese. The next thing accomplished in the work at Brodhead was the successful use of the cultures. A comparison was made between the use of the cultures and the usual method of making Swiss cheese, using pure milk in each case. In both cases, excellent results were obtained but the culture method showed a gain of about 30% in Fancy cheese over the usual method. The third thing accomplished was the demonstration that Swiss cheese could be produced during the winter if there is an available milk supply. During the summer of 1922, work is to be carried on in Green county for the investigation of "stinker" cheese, which has caused recently a great deal of trouble for the Swiss cheese makers.(38)

The Outlook for the Swiss Cheese Industry.-

The use of scientific methods in testing the milk and in the manufacture of Swiss cheese will enable cheese makers to produce a greater amount of cheese and of a higher grade than has been possible in the past. This will make the industry much more profitable for the higher grade products command the higher prices. It appears that the market will absorb any reasonable increase in production of Swiss cheese for many years to come.

Rapid changes in the industry have been made in the past few years. In 1914, the United States imported 22,500,000 pounds of Swiss cheese. This was about equal to the amount of Swiss cheese produced in Wisconsin in 1919. The war not only resulted in the cutting off this supply from Europe, but caused the price in this country to advance from fourteen cents a pound in 1914 to fifty-four cents a pound during the war.

It appears that the making of Swiss cheese will tend to concentrate in large factories. Large scale factory production of Swiss cheese is succeeding in Pennsylvania,and in Ohio and California factories on a smaller scale are succeeding. In Wisconsin and outside of Green county, a large factory for the manufacture of Swiss cheese is at present being constructed. The farmers and cheese makers in Green county are awake to the greater possibilities of closer cooperation between themselves and to a future of large scale factory production. They are also awake to the benefits of closer cooperation in marketing their products.(39)

It seems that Swiss cheese will continue to be the chief product of Green county. Condensaries, located at Monroe, New Glarus, Monticello and Albany, have taken much of the milk in the immediate vicinities of these towns, but the Swiss cheese industry as a whole has not been disturbed to any great extent. The fact that a very large percentage of farms in Green county are located too far from a shipping center to make it profitable to deliver milk at these points will tend to cause an increase in the cheese industry in the county.

Distribution of Swiss Cheese.-

The first areas to produce Swiss cheese in Wisconsin were the sections settled by the Swiss people. This same condition is said to be true for the first Swiss cheese manufactured in New York and Ohio. The

Swiss have a great many notions as to soil and climatic conditions conducive to the production of Swiss cheese. Some of these notions appear to have been taken over by some students of the Swiss cheese industry. It has been stated that Swiss cheese is more sensitive to soil and climatic conditions than other kinds of cheese; that the Swiss cheese factories in Wisconsin are nearly all on land 900 to 1000 feet in altitude and that 95% of the 275 factories are on limestone land, while 70% of the 106 factories making Limburger in the same region were located in the low, sandy, warmer lands of the Sugar river bottoms.(40)

In 1919, Green county contained 151 cheese factories. Of these, 39 were producing Limburger. But of these 39 making Limburger, 15 were also producing Swiss cheese in connection with Limburger; and of the 20 factories producing only Limburger, but 3 could have been only on sandy soils. It is said that the making of Limburger is decreasing owing to the lessened demand in the past few years and Swiss cheese production is at present succeeding on the low Sugar river bottoms; e.g., Brodhead is located on the sandy terrace soils of the Sugar river valley. The manufacture of Swiss cheese is successful in various plants outside of Wisconsin, and no consideration of particular soil conditions is ever considered in their location. Even though the majority of the soils in Green county are derived from limestone, still most of them are acid - so acid, that in the vicinity of Monroe, the use of ground limestone has proven necessary to the successful production of alfalfa on many farms.

It appears that the presence of the Swiss people in a region has been the real reason for the development of a Swiss cheese industry. It appears, however, that geographic and economic factors were very important in the origin of some of the varieties of cheese in the Old World. These influential factors appear to have been temperature, relative humidity and

marketing conditions. For example, Roquefort, a mold ripened cheese, is produced in large quantities near the coast in western France where the air is damp all the time. Limburger is a soft cheese which originated on the meadows of Holland. Swiss cheese is a product of an area of high elevation and became what it is on account of its circumstances and surroundings. For in the high mountains of Switzerland, there were neither highways nor railroads. In order to dispose of their milk, it was necessary for the inhabitants of these high areas to make it into a kind of cheese that would bear difficult transportation methods and also possess long keeping qualities.(41)

The People of Green County.-

It has been estimated that 60% of the inhabitants of Green county are Swiss or of Swiss descent. The majority of the business men in the county are Swiss, though the greater number of the Swiss are farmers and dairymen. As has been stated, it was dairying that made the Swiss in Green county so well-to-do. Their neatly kept dwellings and well kept barns testify as to their thrift and industry. Their homes are up-to-date in all respects and on their farms is to be found modern machinery of all kinds. These conditions of prosperity are in marked contrast to the poor plight of the early Swiss colonists.(42)

Resume.-

The economic development of Green county from the first settlements down to the present has been throughout its evolution, closely correlated with the geographic environment of the county. Economic factors, especially transportation facilities and markets, have always very materially influenced the particular phases of the economic development as in the one crop period or in the dairy farming period which extends to the present. The historical

factors, especially such as the coming of the Swiss colonists, was very important in determining the development of the Swiss cheese industry of the county. The presence of the Swiss determined very largely the distribution of the Swiss cheese industry and the fact that Swiss cheese can withstand poor means of transportation appears to be another factor making for its early development in Green county. And, since much of land of the county is not easily accessible to railway transportation appears to be a factor making for the continuance of cheese making as the principal industry of Green county. It also appears that dairying is the industry best adapted to the county when we consider how well it fits in with the climatic conditions, the topography, and the economical utilization of the soils of the region.

VI. Conclusions

The production of cheese as the dominant industry in Green county represents a well developed stage in a stabilized and rather intensive form of agriculture. Considering the conditions in the adjoining counties in relation to Green County, it appears only natural that dairying should have become the main industry of the region. The fact that Swiss cheese is the principal product of the county is due to the work of the Swiss settlers and to the fact that there has always been a demand for Swiss cheese at good prices.

The prime requisite for making Swiss cheese is pure milk and it does not seem that soil conditions are such as to have anything to do with producing a grade of milk suitable for making Swiss cheese. Climatic conditions are not limiting factors in making Swiss cheese throughout the northern half of the United States and, moreover, it appears that the main factor in the distribution of Swiss cheese manufacture in the past was the historical one - the presence of Swiss who learned the methods of cheese making in the old country. That dairying as an important industry will continue to advance steadily in the United States is not to be doubted and it seems with the introduction of scientific methods in cheese making will come a further extension of the Swiss cheese industry, not only in Green county but in various other sections of the United States.

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